ROBOTIC PROTOTYPE FOR EXPLORATION AND SAMPLING OF LIQUID IN EXTREME ENVIRONMENTS. J. J. Martinez, S. Giraldo, S. Gonzalez, M. J. Hurtado, N. D. Salgado and D. S. Zapata. Tecnoacademia Manizales – Centro de Automatización Industrial, SENA Regional Caldas

Introduction: In the educational field, robotics plays an important role in applying concepts of science, technology, engineering and mathematics. The branch of robotics that most interest awakens in students is mobile robotics, being perhaps the one that offers more didactic tools.

This work describes the design, construction and programming of a mobile robot prototype, intended for the collection of liquid samples in places with difficult access for the human being; The prototype was the fruit of the work of the Robotics line of Tecnoacademia SENA in Manizales, using pieces of LEGO Mindstorms and VEX-IQ robotic kits, and it was the response to a request made by the Instituto de Astrobiología de Colombia to Tecnoacademia, in the framework of the 3d International Congress of Astrobiology 2016 that was developed in Manizales and whose objective was to promote high quality research.

The prototype was developed based on the Rocker-Bogie suspension system, used by NASA for planetary exploration robots, which forms a stable mechanism to avoid overturnings and jams when raiding irregular terrain; the electronic system has three processors and twelve motors that handle the 6 wheels and the probe for sampling.

The robot is controlled remotely via bluetooth from a tablet containing the routines for the basic movements, with specific speeds for each of the 6 driving wheels, the angles of rotation of the 4 steering wheels, the extension of the probe and the actuation of the sampling mechanism.

The prototype was carried to the Valley of the Tombs, located in the Ruiz volcano, at 4,450 meters above sea level in the National Park Los Nevados, due to the fact that this site presents features similar to the planet Mars, because of its geography, topography and temperature.